

## **INTERACTIVE MOBILE DEVICE**

by inventor

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### **FIELD OF THE INVENTION**

The present invention relates to a portable programmable interactive device used to instruct, monitor and track user activities, particularly in the fields of physical fitness and recreation.

### **BACKGROUND OF THE INVENTION**

The past decade has involved a dramatic increase in consumer spending in the field of health and fitness products and sporting equipment. In the United States alone, an estimated 50 million people work out at least 3 times a week, over 27 million people play golf, and approximately 1 million people receive some kind of physical therapy every day. This has resulted in a strong demand for devices and methods that assist individuals in setting and reaching fitness goals. The currently available devices and methods however, fail to meet the needs of average consumers in many ways. This is especially true in the field of portable devices that may accompany an individual during their workout.

For example, prior art devices capable of being carried with a user on their physical fitness workout are severely limited in their functions. Many of these devices are intended to be incorporated into a wristwatch and are only capable of calculating a runners' speed, time and distance. Other functions may include a heart rate monitor that connects to the wristwatch device. There is little or no feedback from these current devices and methods. See U.S. Patent number 6,002,982 that describes a device used to aid a user in their fitness workout.

More sophisticated prior art devices that do allow for operator interactions are not portable and are usually mounted to the exercise equipment. For example, see U.S. Pat. No. 6,066,075 to Poulton. Poulton's patent details a computer apparatus that provides feedback to an individual while the individual is on a treadmill. The structures and sensors necessary in this type of device are not intended to be portable.

In addition to the failures of the above devices, up to this point there has been no device created to replace a personal trainer. In order to receive proper instructions to perform an exercise, currently a personal trainer must be present during the workout.

In conclusion, the prior art methods and devices fail to provide a comprehensive and portable solution that may provide instruction, feedback, and track and monitor the physical fitness activities of an individual.

## **SUMMARY OF THE INVENTION**

The present invention improves on the prior art methods and devices by providing a portable, programmable, interactive device that instructs, monitors, tracks, and provides feedback and motivational information to the user. One embodiment of the device comprises a housing configured to be carried by the user, a display for displaying information to the user, a memory for storing data relating to programs, workouts, exercises and user inputted data, an interface operable by the user to select and input data, and a processor in communication with the display, the interface, and the memory operable to control the display and to control the storage and retrieval of data from the memory.

The device according to the present invention would provide a method of controlling a portable interactive device for providing instructions for personal physical fitness training, comprising the acts of allowing the user to select from a plurality of workouts, allowing the user to select from a plurality of exercises within each workout, and providing to the user a set of instructions based on the user selections, wherein each of the sets of the instructions comprises audio and visual data.

In addition to providing instructional material, the device further allows the user to program, store, and display personalized workouts. An individual may also enter and store personal statistics and download and store music to be played while exercising. The device also gives the user the ability to monitor and display the heart rate of an individual when a heart rate monitor is connected to the device. Feedback and motivational information are also displayed to the user in response to the personal statistics.

In another embodiment of the invention, the device allows the user to connect and access web based tools and the Internet. One type of connection provides a docking station that allows the portable device to connect to external computers and access the Internet. Information may then be downloaded and stored into the devices' memory for use at remote locations. Information may also be uploaded from the device to the external computer for storage and analysis.

The present invention therefore provides a portable device that overcomes the deficiencies of prior art devices and is capable of meeting all the needs of the active individual.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 shows one embodiment of the present invention.

Figure 2 shows a first embodiment of the present invention held by a user.

Figure 3 shows a first embodiment of the present invention in a docking station.

Figure 4 is a schematic diagram of the device according to the present invention.

Figure 5 shows the device displaying the main menu function.

Figure 6 is a flowchart showing one method enacted by the main menu function of the present invention.

Figure 7 shows the device displaying the personal profile function.

Figure 8 is a flowchart showing one method enacted by the personal profile function of the present invention.

Figure 9 shows the device displaying the reference library function.

Figure 10 is a flowchart showing one method enacted by the reference library function of the present invention.

Figure 11 shows the device displaying the workout library function.

Figure 12 is a flowchart showing one method enacted by the workout library function of the present invention.

Figure 13 shows the device displaying the programs exercise execution function.

Figure 14 is a flowchart showing one method enacted by the programs library function of the present invention.

Figure 15 shows the device displaying the music library function.

Figure 16 is a flowchart showing one method enacted by the music library function of the present invention.

Figure 17 is a view of a web page used in the present invention.

Figure 18 is another embodiment of the invention relating to the control features.

Figure 19 is another embodiment of the invention relating to the clip feature.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Figure 1 illustrates one embodiment of the portable programmable interactive device 10 according to the present invention. The device 10 includes a case or housing 12 that contains and houses the necessary electrical components for operation of the device. A clip 14 is attached to the back of the device 10 that allows the portable device to be easily grasped for carrying. A display 16 is arranged on the front of the case 12 so that the user can view the numerous types of information.

With further reference to Figure 1, control buttons 18, 20 and 22 are provided for controlling the functions of the device 10. The device 10 is designed to be worn or carried by the user during their physical fitness workouts or other daily activities. The portability and ease of use make the device 10 equally well suited for situations where the user is at some remote or outdoor location. Some examples include a golf course, on a bicycle ride, grocery store (shopping for food articles pursuant to a nutrition database), at the beach, etc.

Figure 2 illustrates the compact size and portability of the device 10. A user's hand 25 easily grasps the device 10 with the aid of the clip 14 as shown in Figure 1. The clip 14 may also be used as a stand in which the user may place the device 10 on a table and view the screen 16. For further details regarding the adjustable clip, see copending patent application xx/xxx,xxx filed November 15, 2003, entitled "clip", attorney docket number 41963-8003, by inventor.

As shown in Figure 3, the device 10 may be plugged into an external computer docking station 26. When in the docking station 26, the device 10 may communicate with an external computer (not shown) by interconnecting a wire 28 between the external computer and the device 10. Other embodiments of the present invention include communications with local and remote computers using any of a variety of wired and wireless approaches such as Bluetooth and USB connections. While in docking station 26, the device 10 is capable of both sending and receiving data to an external computer and charging a battery.

One advantage of the present invention is that the docking station 26 allows the user access to a host of tools and information made available on the Internet. Both instructional and motivational information may be downloaded while the device 10 is in the docking station. Once the necessary information is stored locally on the device 10, the device may be unplugged from the station 26 and again used as a portable device.

For purposes of this disclosure, the external computer described above is simply any suitable computing device, whether portable or stationary (could include also a wireless device with a connection to the Internet). This definition includes, but is not limited to, electronic books, laptop and handheld computers, and desktop computers. Using wireless types of communications for example, the monitoring device 10 may communicate with a web page running on a remote server via the Internet.

The device 10 may include cellular or other wireless or wired communication capability so as to interconnect with the Internet either continuously or periodically. For communication with a remote server, the device 10 may also include some type of memory



chip or memory module that may be removed from the device 10 and inserted into the external computer for transfer of data. It is also a feature of the present invention that the user with the aid of an external computer may program the device 10. For example, the user's preferred workout and exercises may be entered via a keyboard connected to the external computer. The information is then transferred from the external computer into the local memory of the device 10. For more details pertaining to the communications protocols and connections with all types of external computer systems, see copending application xx/xxx,xxx filed November 15, 2003 entitled "Protocol", attorney docket number 41963-8002.

Referring now to Figure 4, the circuitry contained in the device 10 for one embodiment of the present invention is illustrated schematically. The device 10 includes a processor CPU 30 for processing and controlling the various components and functions. A body activity monitor 32 provides a signal indicative of the body activity of the subject to the CPU. In the preferred embodiment of the invention, the body activity monitor would be a heart rate monitor. The operator interface 34 sends signals to the CPU 30 to perform the intended functions as selected by the user. In the preferred embodiment, the operator interface 34 consists mainly of controlling buttons (18,20 and 22 as shown in Figure 1) located on the device itself.

A memory 36 is provided to store all types of data to perform the desired functions of the device. This information includes the internal programs necessary for device operations, workout information, instructional information, motivational information and the user's

personal statistics. The memory 36 typically includes both persistent and transient memory. A battery 38 is also provided to power the device in remote locations. The CPU 30 provides the data to display 40 for viewing by the subject. The memory 36 is interconnected with the CPU 30 and allows storage of data that may be entered by the user through the operator interface 34 or downloaded from an external computer through the external computer interface 44. An audio output connection 42 is provided for headphones or speakers to be connected to the device. Communications with external devices is provided through communications interface 44. This interface may be located in the device itself or may be provided in the docking station 26 as shown in Figure 3. The communications interface 44 may also be a wired or wireless interface.

Figure 5 shows another embodiment of the device of present invention with a main menu of choices displayed to the user. The user may move the highlighted choice bar up and down using keys 42. The BACK key allows the user to go back to a previous display screen. The MUSIC key allows the user to select and play music while working out. The 5 choices displayed that are available on the main menu are "Personal Profile" 51, "Reference Library" 52, "Workout Library" 53, "Programs Library" 54, and "Music Library" 55. In this embodiment, control keys 56 may be used by the operator to move the highlighted selection bar up and down, and to select the highlighted option. The control keys 56 are also used for further selections from additional menus and displays as will be described.

Figure 6 shows a flowchart 60 of steps enacted to select from the choices provided in the main menu. The process begins in step S62 where all the main menu choices, "Personal

Profile", "Reference Library", "Workout Library", "Programs Library", and "Music Library, are displayed to the operator as shown in Figure 5. In step S64, the user operates the keys 56 to highlight and select their desired option. Once the user selection is received in step S64, step S66 continues the interactive displays by proceeding with the next appropriate display screen based on the operator selection. For example, the next appropriate display screens would be as shown in Figures 7, 9, 11, 13 and 15. These figures show display screens of the present invention that involve specific data relative to the operator section made from the main menu choices. For example, Figure 7 shows the display when the operator selects "Personal Profile", Figure 11 shows the display screen when the operator selects the "Workout Library". A specific method of controlling the device is enacted depending on each of the choices from the main menu. Figures 8, 10, 12, 14 and 16 explicitly detail the process for each operator selection.

Figure 7 shows the display to the user when the "Personal Profile" option from the main menu is selected. The name of the user 71 "Jeff Holt" is displayed along with personal data 72 such as height, weight, date of birth, sex, and resting heart rate. Also displayed are choices "5K Running Log" and "Workout Log", 73 and 74 respectively. Using the operator interface keys, the user may enact the next workout, previous workouts completed and view personal statistics relating to those specific workouts. The personal statistics and personal information may also be entered using an external computer and downloaded to the device when the device is placed in the docking station as shown in Figure 3.

Figure 8 shows a flowchart 80 of steps enacted when the user selects the "Personal Profile" option from the choices provided in the main menu. Once the user has selected the "Personal Profile" option from the main menu in step S81, the personal statistics and the user profile are displayed (as shown in Figure 7) in step S82. In step S83 the user may enter personal information into the profile. At this point in the process, the user may choose to enter information into a Program in step S84, or enter information into a Workout Log in step S85. If step S84 is enacted, the user may enter data or personal information in to a specific Program in step S84 or further information into a specific Workout in step S86. If step S85 is enacted, the user is prompted to enter information into a Workout Log or given the ability to enter data into a Past Workout in step S87. In step S88 the user may quit this process and return to the Main Menu in step S89, otherwise the process continues back to step S83.

Figure 9 shows the display to the user when the "Reference Library" option from the main menu is selected. The display for example shows a person performing a "Two Handed Curl" exercise. The "Reference Library" option allows the user to browse through a programmable reference library and to access video and audio data that provides instructional information relating to a specific exercise. If a user is unclear as to how to perform a specific exercise, a video clip 91 of the exercise being performed may be displayed on the screen. Also available and stored in the "Reference Library" are text instructions and audio instructions. The text instructions may also be displayed to the individual if desired. The present invention also allows for audio information to be played simultaneously with the video clip 91. This further enhances the users' ability to perform the exercise as intended and thereby receive the maximum benefit from their workout.

Figure 10 shows a flowchart 100 of steps enacted when the user selects the “Reference Library” option from the choices provided in the main menu. Step S101 begins the process when the user selects the “Reference Library” option from the choices provided in the main menu. Once the user has selected the “Reference Library” option from the main menu, in step S102 a plurality of categories of exercises are displayed to the user. Also in this step, the user highlights and selects a specific exercise from the selected category. Examples of exercise category choices would be for example “Abdominal Exercises” or “Free Weight Exercises”. Once a specific category is selected, a menu of exercises is displayed to the user in step S102. For example if “Arm Exercises” is selected, exercises such as “Wrist Curl”, “One Handed Curl” and “Two Handed Curl” are displayed. Finally in step S102 the operator selection of a specific exercise is received, “Two Handed Curl” for example. In step S103 the user selects what type of instructional information is to be accessed from the Reference Library. In step S104 the selected video or audio instructional information is displayed to the user. As shown in Figure 9, a video clip of “Two Handed Curl” is displayed so the user can see how to correctly perform the exercise. After viewing the video clip and/or hearing audio instructions, the user may quit the “Reference Library” option in step S105. In step S106 the user may also choose the “Back” option by activating the appropriate buttons on the device and return to the main menu.

Figure 11 shows the display to the user when the “Workout Library” option from the main menu is selected. This option also allows the user to access their personalized specific workout plans. Figure 11 shows an example of tracking a specific exercise “Threshold 800” within a “Track Workout”. This option also allows the user's heart rate 111 to be monitored

and displayed on the screen with a heart rate monitor connected as shown in Figure 4. The user is also able to enter the actual statistics 113 of the performed workout to compare with planned statistics 112 of the planned routine.

Figure 12 shows a flowchart 120 of steps enacted when the user selects the "Workout Library" option from the choices provided in the main menu. Once the user has selected the "Workout Library" option from the main menu in step S121, the method begins in step S122 where a plurality of workouts are displayed to the user. Also in this step the user highlights and selects a specific workout. Examples of workout choices would be for example "Abdominal Workout" or "Track Workout". Once a specific workout is selected, a menu of exercises is displayed to the user in step S123. For example, if "Chest Workout" is selected, exercises such as "Bench Press", "Dumbbell Flys", and "Pushups" are displayed. Also in this step the operator selection is received. In step S124 a planned routine for the selected exercise is displayed to the user. As shown in Figure 13, a number of repetitions and weights for each set number are displayed.

At this point, the user may begin to perform the selected exercise according to the displayed information. If for instructional purposes the user desires to view a video clip of the exercise being performed, the "INFO" button may be depressed in step S125. A previously stored video clip in the reference library is then automatically retrieved and played for the user (as shown in Figure 9). If the user knows how to perform the selected exercise step S125 may be bypassed. Once the user is done with the exercise, the actual personal statistics may be entered and stored by the device into memory in step S126. After

entering the actual personal statistics, it is determined if the workout is completed in step S126. If there are more exercises stored in the workout routine, the next exercise is automatically displayed as the process returns to step S122. If the workout is finished the user may return to the main menu in step S128. This process essentially guides the user through the workout with stored routines, instructional information if desired, and the ability to log their performance.

Figure 13 shows the display to the user when the “Programs Library” option from the main menu is selected. In this mode the display prompts the user to enter a specific workout, a specific exercise, and the number of repetitions and amount of weight used in each set. Figure 13 shows how the display would appear to the user when entering the desired workout plan for the “Bench Press” exercise. In this example, the operator is able to enter data relating to sets 131, data relating to the number of repetitions 132, and the amount of weight used in each set 133. The present invention also allows the programming of workout plans through the use of an external computer connected via the docking station as shown in Figure 3. The programmed workout data may also be downloaded from a website.

Figure 14 shows a flowchart 140 of steps enacted when the user selects the “Programs Library” option from the choices provided in the main menu. Once the user has selected the “Programs Library” option from the main menu in step S141, the method continues in step S142 where a plurality of workouts are displayed to the user. Also contained in step S142 are the user highlighting and selecting a specific workout program. In step S143 the user is prompted to program a workout or exercise. In step S144 the newly programmed workout

data is stored into the device memory. After entering the new data, the user may quit the program option in step S145. In step S146 the user may also choose the back option by activating the appropriate button on the device, and return to the main menu.

Figure 15 shows the display to the user when the “Music Library” option from the main menu is selected. In this example the user has stored music selections from Led Zeppelin 151, Michael Jackson 152, Kiss 153, Madonna 154, and Kenny G. 155. Using the controlling keys 56, the operator is able to move the highlighted selection bar up and down, and then make their appropriate choice. The music selection is played through some externally connected speaker system via the audio output connection 42.

Figure 16 shows a flowchart 160 of steps enacted when the user selects the “Music Library” option from the choices provided in the main menu. Once the user has selected the “Music Library” option from the main menu in step S161, the method begins in step S162 where a plurality of music selections are displayed to the user as shown in Figure 15. Also in step S162 the user highlights and selects a specific music selection. Once a specific selection is chosen, it is played through the externally connected speakers in step S163. At this point the user may begin to perform the selected exercise while listening to the music selection. In step S164 the user may quit or stop the music. In step S165 the user may also choose to return to the main menu options by activating the appropriate buttons on the device.

Figure 17 shows a website 170 that the user may interact with while using the device of the present invention. The user may choose to proceed with one of the selections available on the selections bar 171 across the top of the home page. For example, choices such as



"Getting Started", "The Pro Shop" and "Coaches Corner" are available. These options lead to directions on how to operate the device, an online sports store, and email communications with an expert trainer, respectively. Other selections available to the user allow for tracking, monitoring and feedback of the users' workout statistics. As described above, all types of information (text and video) and music may be downloaded and stored into the device for use in remote locations.

Interacting with an external computer also allows one individual to compete against another. For example, a first user may receive information regarding the workout performed by a second user, then compete against the second user and vice versa. This competition may be live or time adjusted, e.g., a workout entered and stored previously on the home page 170 by the second user with which the first user competes against.

Figure 18 shows another embodiment of the present invention. This embodiment describes another specific control key arrangement. Control buttons and switches 181, 182, 183 and 184 are located on the top of the device. Button 181 provides inputs for the "on", "enter", and "off" functions of the device. Switch 182 performs the "up" and "down" functions of moving the highlight bar throughout the various displays. Once the appropriate choice is highlighted, it may be selected using button 181. Button 183 is a "back" button as is conventional for switching to a previous display screen. Button 184 is a "menu" button for allowing the user to jump to the "menu" function as described above.

In this embodiment, button 181 sits above the surface of the device. Switch 182 is toggle switch that is mounted below the surface of the device, where the top of the switch

sticks up above the surface of the device and equal in height to on/off button 181. The “Back” button 183 is also above the surface of the device and on the same level as button 181. The “Menu” button 184 is level with the surface of the device. The control buttons as described with reference to Figure 18, allow the user to operate the device in all of the modes as described in Figures 2-17. Other embodiments of the invention may include other types of control button arrangements that allow the user to operate the device in the modes described herein.

Figure 19 shows another embodiment of the present invention. In this embodiment, the position of the clip 14 is not adjustable. The clip 14 in this embodiment is also shorter in length than the clip shown in Figures 1-3 above. This clip arrangement has advantages such as being smaller and more compact, while still providing the user with the functions of portability, either hand-held or clipped onto another article. The clip 14 may also function as a stand for the device 10. The display of the device 10 may be easily viewed when the device is placed on a flat surface supported by the clip 14. This allows the user to operate the device in a “hands free” manner. For example, the individual may practice or perform an exercise while watching the visual data of the exercise being performed. Again, other embodiments of the invention relating to the clip function of the device are incorporated by reference in copending patent application xx/xxx,xxx filed January 27, 2004, attorney docket number 41963-8003.

The embodiments relating to a portable interactive device as described above are to be considered as illustrative and not restrictive. The invention is not to be limited to the details given herein, but may be modified within the scope of the appended claims.